

Union Canal Locks
Bernville Vicinity
Pennsylvania
~~Bern~~ County
Berk

HAER No. PA-66

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PA,
C-BERNV,
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D.C. 20240

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HISTORIC AMERICAN ENGINEERING RECORD

UNION CANAL LOCKS PA-66

DATE: 1821-1827, with later alterations

LOCATION: Various sites for approximately four miles
on the east bank of Tulpehocken Creek, ~~Bern~~ Berks
County, Pennsylvania

DESIGNED BY: Canvass White

OWNER: no longer extant; inundated ca. 1978 by Army
Corps of Engineers Blue Marsh Lake Project

SIGNIFICANCE: The ruins of these locks document 19th -
century canal technology, and illustrate the
importance of water transportation in the
first half of the century. Although the
Union Canal failed to become the major trade
route its sponsors had hoped for, the canal
was important for transportation and
communication in the local farming community.

HISTORIAN: Stuart Campbell, 1976

TRANSMITTED BY: Monica E. Hawley, Historian, 1983

UNION CANAL LOCKS

The Bernville Protective Works, Blue Marsh Project, includes the sites of 15 Union Canal Locks. They are on the abandoned canal channel near the east bank of Tulpehocken Creek in Jefferson, Penn, and Bern Townships, Berks County, Pennsylvania. These locks are an integral part of the history of the Union Canal Company, 1811-1884. The presence of the canal also influenced the development of neighborhoods such as Bernville through which it passed.

THE CANAL

The Union Canal, built by a joint stock company to connect Reading on the Schuylkill River with Middletown on the Susquehanna River, failed to realize the goals of its predominantly Philadelphia investors. It failed to pay regular or increasing dividends and did not attract much through traffic from west of the Susquehanna. However, it did carry a large local trade and had a significant impact on communities it served.

The 80-mile canal realized the hope of connecting the Schuylkill and Susquehanna Rivers first expressed by William Penn. In 1762, 1770, and 1791, "vigorous efforts had been made to effect construction." The Union Canal Company, so named because it inherited privileges of two earlier companies, succeeded in raising money to complete construction between 1821 and 1827. [1] Pennsylvania's excitement and apprehension about the Erie Canal spurred investors. The Commonwealth also helped the cause by the legislature's 1821 decision to guarantee 6 percent interest on stock sales. [2] The completed canal cost \$18,578.51 per mile, which compared favorably with the Erie Canal's \$19,255.40 per mile. [3]

Canal engineers were Loammi Baldwin and Canvass White. Baldwin's tenure was brief. He planned wider locks than the 8-foot channel the Board of Managers desired. They feared the limestone underlying portions of the route meant the canal would leak and should therefore be kept small to stay filled. Baldwin also disagreed with the Board about the planned route through the summit level near Lebanon, Pennsylvania. [4] Consequently, Baldwin resigned early in 1823 after one year's service.

Apparently Canvass White, Baldwin's successor, determined most of the canal route. In particular, the canal right of way through Blue Marsh project area was built during White's tenure. White's labors ended during the winter of 1827-1828, and the Canal enjoyed a full season's operation during 1828.

Loammi Baldwin's criticism of narrow locks was correct. Through

freight from the western branches of the state system of canals went elsewhere to avoid transferring cargo to smaller Union Canal boats. [5]

Four additional factors hampered the Union Canal. A feeder northward to Pine Grove in Schuylkill County, designed to provide anthracite traffic, failed to develop a large through tonnage. [6] The Pennsylvania state system of internal improvements bypassed the Union as the eastern link in the system in favor of constructing its own railroad. Consequently, the Union Canal's "business and prestige...suffered severely." [7]

Thirdly, in 1839, Democratic Governor David Rittenhouse Porter vetoed aid the Legislature voted the company to enlarge the Union Canal's channel. Porter argued the Commonwealth's treasury lacked the appropriated \$400,000. The Union Canal Company despaired because the firm lacked cash and could not raise sufficient funds on its own. The managers feared the imminent completion of the Baltimore and Susquehanna Railroad and the Susquehanna Tidewater Canal would further reduce traffic entering the western gates of their improvement.

The competitors opened in 1840 and confirmed the Union Canal's Managers' worst fears. Traffic declined rapidly. The combination of all the negative factors meant that 1835's receipts of \$135,354 were the best the Union Canal was destined to enjoy. [8]

The Managers eventually decided to widen the canal despite the cost. Philadelphia engineer James C. Worrall directed the reconstruction. Work began in 1851. The remodeled canal opened for the 1857 season. The enlargement raised Union Canal construction costs to nearly 6 million dollars and "ruined" the company financially. [9] Unfortunately, the Lebanon Valley Railroad from Reading to Harrisburg also opened in 1856. That road traversed the same counties the Union Canal served. The Lebanon Valley dashed hopes for the canal's success. In 1860 trustees for the bondholders took over the company. The canal slowly died during the next 25 years. In 1884 operations ceased.

The channel and locks were purchased by Eastern Realty Company, a subsidiary of the Reading Railroad. [10] Eastern Realty found no use for Union Canal facilities. The abandoned locks, channel, and accompanying structures slowly deteriorated to 1976's ruins.

THE UNION CANAL AND LOCAL DEVELOPMENT

The canal failed to become the nationally important waterway its planners envisioned. This disappointment must not obscure its impact on communities through which it passed. The canal was for years an important commercial artery for eastern Pennsylvania. The area affected by Blue March Dam provides a good example of its impact.

The Tulpehocken Creek Valley, through which White built the canal, was a substantial farming region before the canal opened. However, that improvement provided a relatively fast and dependable highway. After the canal opened, residents could harness the Tulpehocken's water power for a variety of manufacturing activities because the canal assured either a Philadelphia or Reading market or access to other rural communities along the line of the canal. The canal also meant persons needing services might appear.

In the vicinity of what was to become Bernville, local landowner Thomas Umbenhauer recognized the opportunities the canal would provide. Therefore, in 1819 he plotted Bernville. [11] The proposed town was located near Lock 36, which was close to the confluence of North Kill Creek and the Tulpehocken. Umbenhauer chose his site wisely. After the canal opened, the "place became a trading center for grain and lumber" [12] and "a very busy shipping" [13] center host to many kinds of tradesmen.

By 1870, census takers found Bernville's "industries" included two cabinet makers, a tin smelter, a tannery, a "segar" maker, two coach repairers, a tombstone carver, and a wagon and coach maker. [14] Bernville also boasted four hotels, three canal warehouses, a foundry and machine shop, gristmill and distillery, and a sawmill. [15]

Concurrently, business in the neighboring village of Mt. Pleasant, near Lock 41, included a tannery, hotel, and store. [16] Between the two settlements, at least two activities, a warehouse for grain storage and Conrad's warehouse, were built in response to the opening of the canal.

This pattern recurred along the 80 miles the Union Canal traversed in Berks, Lebanon, and Dauphin Counties. From early spring to late fall, as many as 900 boats per month carried gypsum, grain, flour, lumber, anthracite and bituminous coal, iron, leather, smoked meats, whiskey, tobacco, salt, plaster, hemp, wool, hides, and limestone between Bernville and other points on the canal or from producers to eastern markets. [17] For several decades the Union Canal brought activity and prosperity to inland rural areas such as Bernville and Mt. Pleasant.

LOCKS 31-46

The locks within the Blue Marsh Project area formed part of the 54 locks on the Eastern Division of the Union Canal. The Division's locks began with one at the summit level four miles east of Lebanon and ended 37 miles southeast at Reading near the confluence of Tulpehocken Creek and the Schuylkill River. For most of this distance the canal paralleled the north bank of the Tulpehocken. [18] Approximately three miles north of Reading the canal crossed the creek and paralleled the

southern bank the last few miles.

All surviving locks are James Worrall's remodeling of Canvass White's original design. The 1851-1856 widening changed neither the channel nor construction techniques. White's channel or "ditch" between locks was 26 feet wide at the bottom, 36 feet wide at the surface, and 4 feet deep. [18] The towpath, 10 feet wide, was on the south bank. The berm bank was 5 feet wide.

Most Union Canal locks were 5 and 6 feet lift. Locks 31 to 46 were no exception: [19]

<u>Lock</u>	<u>Lift</u>
31	5 feet
36	5 feet
37	6 feet
38	5 feet
39	6 feet
40	5 feet
41	6 feet
42	6 feet
43	6 feet
44	5 feet
45	5 feet
46	5 feet

Canvass White built the locks 8-1/2 feet wide and 75 feet long. The boats for these locks carried approximately 25 tons of cargo. [20] James Worrall supervised widening the locks to 15 feet and lengthening them to 90 feet. He widened the channel to 28 feet at the bottom, 40 feet at the surface, and 5-1/2 feet deep. After this remodeling the canal could accommodate boats carrying 80 to 90 tons of cargo.

"Dressed sandstone" was used for both construction and widening. [21] Lock 37's ruins clearly show stones with a greenish hue. Local legend asserts these "West Chester greenstones" were brought 50 miles from that community in neighboring Chester County. [22]

In both the 1820's and 1850's the sandstone was laid in "hydraulic cement." This term described mortar made with trass, "a pumice-like substance of volcanic" formation, which hardened under water. [23] Canvass White had relieved the Erie Canal investors of import costs by discovering the substance along the line of construction. Simeon Guilford, an Erie co-worker White hired to help with the Union Canal, discovered trass along the Union's channel. [24]

White and Worrall provided the locks with wooden swing gates. Two-inch white pine and oak were used for the gates whose frames were bolted into the lock wall. The design of locks and gates reflected White's study of English canals during the last years of the second decade of the century. [25] The Union Canal enjoyed the services of an engineer with "better knowledge of canal construction--especially locks--than any other man in America." [26]

Lock 36 tested White's skills. Here he had to depart from the design used for the rest of the locks in the Blue Marsh area. At Lock 36 the Canal channel crossed Northkill Creek, which here joined the Tulpehocken slightly southwest of Umbenhauer's planned town. White decided to build a "tumbling" or slackwater dam. [27] In this arrangement a dam slowed Northkill Creek. Normally water passed over the dam face. The dam merely slowed the Northkill at a point about 58 yards northward where the creek became part of the canal. A bridge carried the towpath across the creek. A guard lock on the canal channel east of the Northkill kept the stream from flooding the canal. Lock 36 lifted boats 5 feet from the Northkill to the canal channel. For this arrangement the company paid \$637.00 for the dam, \$950.00 for the lock, and \$230.00 for the towpath bridge. [28]

Little documentation exists about either the construction or the reconstruction of these locks. During White's tenure, advertisements in eastern papers attracted firms which had helped build the Erie Canal. [29] The Union Canal was divided into sections, and once White signed a contract work began whether or not adjoining sections existed. During Worrall's reconstruction the entire western division closed for enlargement during the 1851 season. The eastern division, including locks 31 to 46, closed during 1855 and 1856.

These locks were part of an internal improvement overshadowed by more ambitious or more successful ventures. Nevertheless, the Union reflected early 19th-century canal engineering and greatly influenced the development of localities through which it passed.

Footnotes

1. James Weston Livingood, The Philadelphia-Baltimore Trade Rivalry, 1780-1860 (Harrisburg, Pennsylvania: Pennsylvania Historical and Museum Commission, 1947), p. 100. Quoted words in the previous sentence are from this source. This narrative leans heavily on Livingood for the general history of the Union Canal. Where sources differ in interpretation I have chosen Livingood.
2. James Weston Livingood, "The Economic History of the Union Canal," Historical Review of Berks County, III (January 1938), p. 52.
3. New York. Report of the Canal Commissioners (1835). Although the report is paginated, quotation is from a chart folded into the volume titled "Description, Cost, Tolls, &c. of Various Canals in the United States."
4. Robert A. Pawling, "The Union Canal's Reading Reaches," unpublished paper loaned to author, p. 8.
5. Livingood, "Economic History," p. 55.
6. Ibid.
7. Ibid.
8. Livingood, Philadelphia-Baltimore, p. 114.
9. Ibid., p. 113.
10. Frederick D. Wood, "(Opinion of Counsel) 'The Union Canal,'" unpublished document, Army Corps of Engineers, p. 2.
11. Cyrus T. Fox, ed., Reading and Berks County, Pennsylvania, A History, Volume I (New York: Lewis Historical Publishing Company, Inc., 1925), p. 359.
12. Morton L. Montgomery, comp., Historical and Biographical Annals of Berks County, Volume I (Chicago: J. H. Beers and Co., 1909), p. 915.
13. Fox, Reading and Berks County, p. 359.
14. U.S. Department of Commerce, Bureau of the Census, Ninth Census of the United States, 1870: Manufactures, Berks County, Pennsylvania, Bernville Borough.

15. Janice C. DeLong and Pearl B. Kline, Bernville, Pennsylvania, 1851-1876 (Bernville, Pennsylvania: Bernville Bicentennial Committee, 1976), p. 39.
16. L. Fagan, surveyor, Township Map of Berks County, Pennsylvania (Philadelphia: H. F. Bridgens, 1861), Bern Township plate.
17. Herbert P. Reed, "The Story of the Union Canal and the Schuylkill Canal," unpublished paper in possession of Marie Graeff, Robesonia, Pennsylvania.
18. Dean Augunst, The Two Canals of Lebanon County, Lebanon County (Pennsylvania) Historical Society Papers, Vol. XLV, Number 1 (Lebanon Historical Society, 1966), Centerfold map of Union Canal.
19. Pennsylvania Archives, Union Canal Papers, MG 174, Carton 19, "Various" folder.
20. New York, Canal Commissioners, and Livingood, "Economic History," p. 55.
21. Pawling, "Union Canal."
22. George M. Meiser, IX, "Historical Survey of Blue Marsh Project Area," Historical Review of Berks County, XXXVI, Number 3, p. 103.
23. Harry Sinclair Drago, Canal Days in America (New York: Clarkson N. Potter, Inc., 1972), p. 11.
24. Augunst, The Two Canals, p. 33.
25. Drago, Canal Days, p. 177.
26. Ibid.
27. DeLong and Kline, Bernville, p. 34.
28. Pennsylvania Archives. Union Canal Papers, Carton One.
29. Augunst, The Two Canals, p. 31.

Bibliography

Augunst, Dean. The Two Canals of Lebanon County. Lebanon County (Pennsylvania) Historical Papers, Volume XLV, Number 1. Lebanon, Pennsylvania: Lebanon Historical Society, 1966.

Augunst's account is admittedly local history written for a general audience. Nevertheless, it includes local history of the canal, photographs and a contemporary map otherwise unavailable.

DeLong, Janice C., and Kline, Pearl B. Bernville, Pennsylvania, 1851-1976. Bernville Bicentennial Committee, 1976.

Commemorative volume by local historians. The volume contains rare maps and late 19th-century photographs from private collections.

Drago, Harry Sinclair. Canal Days in America. New York: Clarkson N. Potter, Inc., 1972.

Drago's work is popular history for the canal buff. He includes details valuable to the student of 19th-century American canals.

Historical Society of Pennsylvania. Union Canal Company Annual Reports.

The depository holds the published reports. Some handwritten drafts are in the Pennsylvania Archives.

Livingood, James Weston. "The Economic History of the Union Canal." Historical Review of Berks County, III (January 1938), 51-57.

Livingood is the principal historian of the Union Canal. The title is accurate. Little technical or operational data is included.

. The Philadelphia-Baltimore Trade Rivalry, 1780-1860. Harrisburg, Pennsylvania: Pennsylvania Historical and Museum Commission, 1947.

This is the basic general history of the Union Canal. Only one chapter is devoted to the Union, but the history of the improvement is thoroughly researched, clearly written, and fitted into the larger story of its importance, which Livingood's title symbolizes.

Meiser, George M. "Historical Survey of Blue Marsh Project Area." Historical Review of Berks County, XXXVI, Number 3, 98-110.

This article is a useful listing of various sites in the Bernville-Mt. Pleasant area which survived through 1971. The article includes rare photographs and a useful 1971 map relating 19th-century sites

to current landmarks. Meiser includes some local history and legend.

New York. Report of the Canal Commissioners (1835).

An important contemporary source for canals built by 1835. A chart compares canals by several technical and economic criteria.

Pawling, Robert A. "The Union Canal's Reading Reaches." Unpublished paper loaned to author.

Mr. Pawling is a Reading, Pennsylvania, historian. The major contribution of this paper is the combination of technical data and local history. The audience is local persons who hope to reconstruct a portion of the canal within Berks County park land. This goal makes the paper a unique effort.

Pennsylvania Archives. Union Canal Papers. Record Group MG 174.

Pennsylvania holds the major collection for the serious student of the Union Canal. Included among surviving manuscripts are lists of lock-keepers, construction contracts, reports from line officers to the Managers, records of property acquisitions, lists of bridges over the Canal, and rates of toll.

Tanner, Henry S. A Description of the Canals and Railroads of the United States. New York: Augustus M. Kelly, 1970.

The volume is a reprint of the 1840 edition. This contemporary source describes the Union Canal before it was widened. A glossary helps the student appreciate the "state of the art" when the Union was constructed.

Wheeler, George. "The Union Canal and Its Relation to Philadelphia." City of Philadelphia Historical Society, Publication 4 (1939), 76-91.

This is a good history of the canal. It includes information not published elsewhere. The emphasis the title stresses makes Wheeler's work unique.